GRASSLAND BYPASS PROJECT

3 Flow and Salinity Monitoring

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Summary

Flow and salinity measurements were taken to monitor the effects of the Grassland Bypass Project (GBP) on the San Luis Drain (SLD), Mud Slough, Salt Slough, and the San Joaquin River. The U.S. Geological Survey (USGS) operated four monitoring stations and the San Luis & Delta-Mendota Water Authority (SLDMWA) operated one station. The California Regional Water Quality Control Board, Central Valley Region (CVRWQCB), measured the salinity of water quality samples collected at these five sites and six other sites where flow is not measured. The San Francisco Estuary Institute (SFEI) compiled this information in monthly and quarterly reports.

Table 1 is a summary of flow and EC sampling methods at the six stations.

Tables 2 - 7 summarize monthly flow, salinity, and salt loads at six locations during the five years of the Project. Note that the historical salinity and load values have been updated and differ from the Water Year 1999 report and errata sheets.

The data record for Water Year 2001 has been compiled for all stations. Flow and salinity sensors performed properly at all stations with a few problems. Data were lost at Stations D and F due to vandalism and equipment failures.

Figure 1 shows the pattern of rainfall and discharge from the 97,000 acre Grassland Drainage Area (GDA) during Water Year 2001. Rain fell during October, November, January, February, March, and April. Peak flow for Water Year 2001 was 82 cubic feet per second (cfs), well below the capacity of the SLD. No drain water was discharged from the Project into wetland water supply channels during Water Year 2001.

The GBP conveyed approximately 28,200 acre-feet of drainage water and about 120,000 tons of salt from the GDA in the San Luis Drain during Water Year 2001. This was about 10 percent less than the volume and load discharged in the previous water year.

Flow and Salinity Measurements

The flow of water passing a point is expressed in terms of volume and time – cubic feet per second or acre-feet per day/month/year. There are various methods for measuring flow.

The salinity of water is estimated by measuring electrical conductivity (EC), which is the ability of a solution to pass an electric current. Current is carried by inorganic solids such as chloride, nitrate, sulfate, and phosphate ions dissolved in the solution, as well as

Table 1. Flow & Salinity Monitoring Methods

Station	Agency	Parameter	Sample frequency	EC to TDS Factor (b)
A	SLDMWA	Flow	Continuous	
	SLDMWA	EC	Continuous	0.74
B	USGS	Flow	Continuous	
	USGS	EC	Continuous	0.74
	CVRWQCB	EC	Daily composite of six samples	
C		Flow	Derived (a)	
	CVRWQCB	EC	Weekly grab	0.68
D	USGS	Flow	Continuous	
	USGS	EC	Continuous	0.69
F	USGS	Flow	Continuous	
	USGS	EC	Continuous	0.68
N	USGS	Flow	Continuous	
	USGS	EC	Continuous	0.62
	CVRWQCB	EC	Daily composite of six samples	

(a) Flow passing Station C is calculated as difference between flows at Stations D and B.
(b) CVRWCB, 1998. Page 15; San Luis Drain factor revised 10/2000.

cations like sodium calcium, magnesium, iron, and aluminum. Total dissolved solids (TDS) is a lab procedure that measures the mass of solids in a solution. The CVRWQCB has calculated factors to convert EC to TDS.

The method for determining flow-weighted concentrations and calculating loads of salt are explained in CVRWQCB, 1998 (pp. 4 - 8).

Station A

Location	San Luis Drain Check 17, near South Dos Palos, California (USGS 11262890) (CVRWQCB MER562)
Responsibility	San Luis & Delta-Mendota Water Authority (Summers Engineering)
Parameters	Stage, electrical conductivity, temperature
Equipment	Sharp-crested weir, stilling well with a Stevens recorder and shaft encoder, staff gauge, weir stick; electrical conductivity/ temperature sensor; data logger, telephone and modem; Sigma autosampler.

Description

Station A is located near South Dos Palos, California. Its purpose is to measure the volume and quality of drainwater as it enters the San Luis Drain from the GDA.

Data Summary

Table 2 and Figure 2 summarize the flow and salinity of water that passed Station A during the five years of the Project.

During Water Year 2001, the total volume of drainage water that passed this site was 27,005 acre-feet. The average flow that passed Station A was 37.4 cfs. The flow reached a maximum of 83 cfs on March 7, 2001. The flow-weighted EC of water that passed the site was about 4,634 microSiemens per centimeter (µS/cm), with a brief peak on March 15, 2001 of 5,810 µS/cm. The load of salt discharged from the GDA was about 125,400 tons during Water Year 2001.

The total volume of water discharged during Water Year 2001 was about 8 percent less than that discharged during Water Year 2000. However, the load of salt discharged was about 3 percent less than Water Year 2000.

Figure 1. Daily Rainfall and Discharge from the Grassland Bypass Project

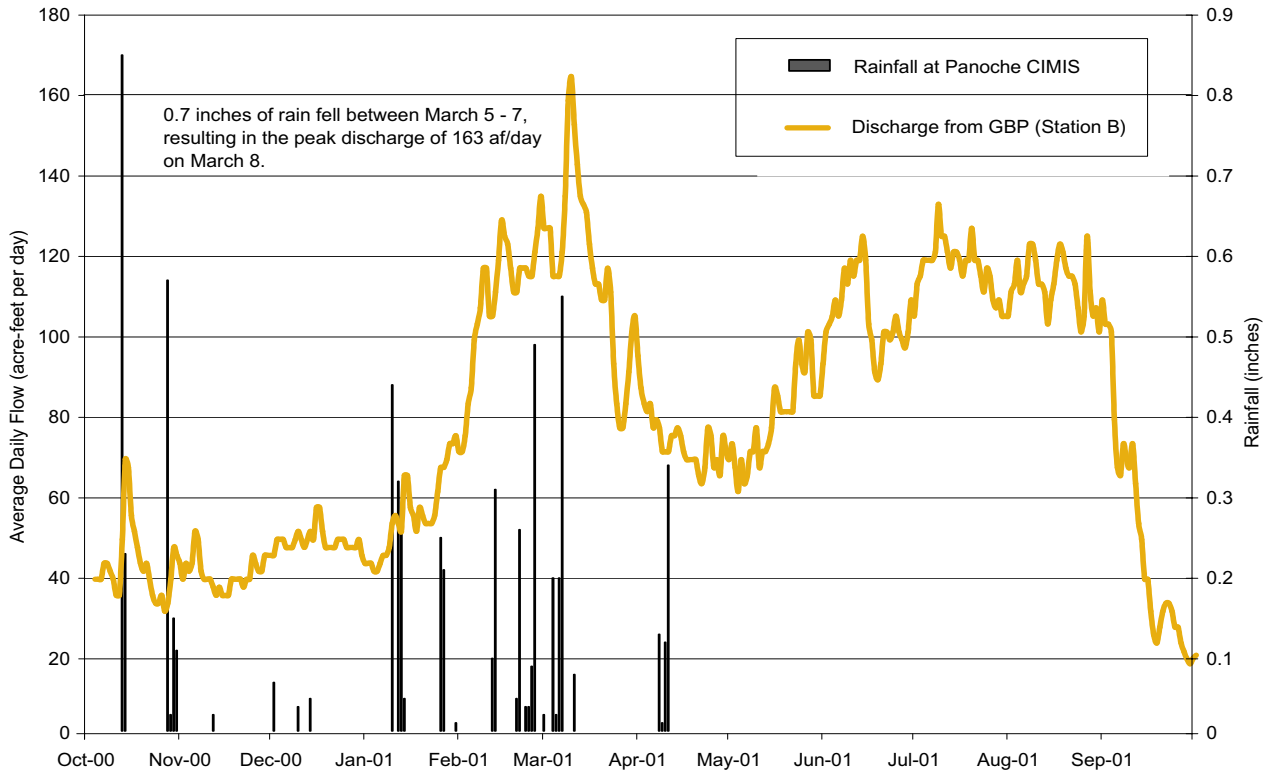


Table 2. Monthly Flow and Salinity of Water Entering the San Luis Drain (Station A) WY 1997 - 2001

	Flow				Salinity					
	Monthly Average		Total		FW EC		TDS		Salt load	
	cfs		acre-feet		µS/cm		mg/L		tons	
Oct-1996	22.0	L	1,350	L	4,326	Rr	3,201	Rr	5,877	Rr
Nov-1996	24.2	L	1,437	L	3,812	Rr	2,821	Rr	5,513	Rr
Dec-1996	29.6	L	1,818	L	4,775	Rr	3,534	Rr	8,737	Rr
Jan-1997	62.2	L	3,827	L	4,804	Rr	3,555	Rr	18,503	Rr
Feb-1997	78.4	L	4,356	L	5,256	Rr	3,889	Rr	23,042	Rr
Mar-1997	83.5	L	5,131	L	4,628	Rr	3,425	Rr	23,898	Rr
Apr-1997	77.6	L	4,619	L	5,391	Rr	3,989	Rr	25,060	Rr
May-1997	69.9	L	4,301	L	4,654	Rr	3,444	Rr	20,145	Rr
Jun-1997	54.6	L	3,251	L	4,823	Rr	3,569	Rr	15,780	Rr
Jul-1997	53.0	L	3,257	L	4,217	Rr	3,121	Rr	13,823	Rr
Aug-1997	49.7	L	3,055	L	3,722	Rr	2,754	Rr	11,443	Rr
Sep-1997	23.3	L	1,384	L	3,311	Rr	2,450	Rr	4,612	Rr
Oct-1997	21.7	L	1,335	L	5,065	Rr	3,748	Rr	6,805	Rr
Nov-1997	16.7	L	994	L	4,640	Rr	3,434	Rr	4,642	Rr
Dec-1997	17.4	L	1,070	L	5,016	Rr	3,712	Rr	5,401	Rr
Jan-1998	20.0	L	1,230	L	5,393	Rr	3,991	Rr	6,676	Rr
Feb-1998	123.0	L	6,833	L	3,200	Rr	2,368	Rr	22,006	Rr
Mar-1998	115.1	L	7,075	L	4,599	Rr	3,403	Rr	32,746	Rr
Apr-1998	91.5	L	5,444	L	4,914	Rr	3,636	Rr	26,923	Rr
May-1998	76.7	L	4,714	L	4,952	Rr	3,664	Rr	23,493	Rr
Jun-1998	61.0	L	3,629	L	5,109	Rr	3,781	Rr	18,659	Rr
Jul-1998	73.8	L	4,538	L	4,408	Rr	3,262	Rr	20,132	Rr
Aug-1998	62.6	L	3,849	L	4,267	Rr	3,158	Rr	16,529	Rr
Sep-1998	47.7	L	2,839	L	3,938	Rr	2,914	Rr	11,252	Rr
Oct-1998	27.6	G	1,700	G	4,972	Gr	3,679	Gr	8,506	Gr
Nov-1998	20.4	G	1,210	G	5,371	Gr	3,975	Gr	6,541	Gr
Dec-1998	18.6	G	1,140	G	5,268	Gr	3,898	Gr	6,044	Gr
Jan-1999	22.7	G	1,390	G	5,010	Gr	3,707	Gr	7,008	Gr
Feb-1999	54.8	G	3,040	G	4,687	Gr	3,468	Gr	14,340	Gr
Mar-1999	52.3	G	3,220	G	5,363	Gr	3,969	Gr	17,379	Gr
Apr-1999	35.9	G	2,140	G	5,511	Gr	4,078	Gr	11,869	Gr
May-1999	48.7	G	3,000	G	4,973	Gr	3,680	Gr	15,014	Gr
Jun-1999	60.9	G	3,620	G	4,581	Gr	3,390	Gr	16,689	Gr
Jul-1999	64.8	G	3,990	G	4,230	Gr	3,130	Gr	16,986	Gr
Aug-1999	64.1	G	3,940	G	3,648	Gr	2,700	Gr	14,465	Gr
Sep-1999	34.9	G	2,080	G	4,234	Gr	3,133	Gr	8,863	Gr
Oct-1999	18.9	S	1,162	Sr	5,423	Rr	4,013	Rr	6,341	Rr
Nov-1999	21.4	S	1,273	Sr	4,693	Rr	3,473	Rr	6,010	Rr
Dec-1999	16.5	S	1,015	Sr	4,853	Rr	3,591	Rr	4,957	Rr
Jan-2000	20.8	S	1,281	Sr	4,158	Rr	3,077	Rr	5,359	Rr
Feb-2000	53.4	S	3,074	Sr	4,554	Sr	3,370	Sr	14,089	Sr
Mar-2000	52.3	S	3,217	Sr	5,051	Sr	3,738	Sr	16,353	Sr
Apr-2000	43.9	S	2,614	Sr	4,669	Sr	3,455	Sr	12,283	Sr
May-2000	47.3	S	2,906	Sr	4,150	Sr	3,071	Sr	12,137	Sr
Jun-2000	63.6	S	3,783	Sr	4,269	Sr	3,159	Sr	16,253	Sr
Jul-2000	61.9	S	3,804	Sr	4,017	Sr	2,973	Sr	15,378	Sr
Aug-2000	58.3	S	3,586	Sr	3,669	Sr	2,715	Sr	13,241	Sr
Sep-2000	27.5	S	1,637	Sr	4,230	Sr	3,130	Sr	6,967	Sr
Oct-2000	15.8	S	972	Sr	4,340	S	3,212	S	4,245	Sr
Nov-2000	15.8	S	940	Sr	4,733	S	3,502	S	4,477	Sr
Dec-2000	18.3	S	1,126	Sr	4,713	S	3,488	S	5,341	Sr
Jan-2001	24.0	S	1,475	Sr	4,692	S	3,472	S	6,965	Sr
Feb-2001	56.6	S	3,142	Sr	4,635	S	3,430	S	14,656	Sr
Mar-2001	56.1	S	3,451	Sr	5,438	S	4,024	S	18,887	Sr
Apr-2001	36.7	S	2,184	Sr	5,183	S	3,835	S	11,392	Sr
May-2001	42.5	S	2,611	Sr	4,318	S	3,195	S	11,346	Sr
Jun-2001	51.7	S	3,077	Sr	4,340	S	3,212	S	13,440	Sr
Jul-2001	58.0	S	3,567	Sr	4,314	S	3,192	S	15,487	Sr
Aug-2001	54.8	S	3,372	Sr	4,096	S	3,031	S	13,900	Sr
Sep-2001	18.3	S	1,088	Sr	4,801	S	3,553	S	5,257	Sr

	Monthly Average	Total	FW EC	TDS	Salt load
	mean cfs	total acre-feet	mean µS/cm	mean mg/L	total tons
WY 1997	52.3	37,786	4,477	3,313	176,433
WY 1998	60.6	43,550	4,625	3,423	195,263
WY 1999	42.1	30,470	4,821	3,567	143,705
WY 2000	40.5	29,350	4,478	3,314	129,368
WY 2001	37.4	27,005	4,634	3,429	125,394

Performance

All equipment performed as required at this site and there were no gaps in data due to malfunction.

Station B

Location	San Luis Drain, near Gustine, California (USGS 11262895, CVRWQCB MER535)
Responsibility	US Geological Survey (flow, EC, temp), CVRWQCB (EC, water quality)
Parameters	Stage, velocity, electrical conductivity, temperature
Equipment	Nitrogen bubbler pressure sensor, 2 - acoustic velocity meters, monthly current meter readings, 2 - EC/temperature sensors, data logger, telephone and modem.

Description

Station B is located about 28 miles northwest of Station A, about 2 miles from the terminus of the Drain. It is the primary site for measuring the flow and selenium load discharged from the GDA into Mud Slough. The performance of the GBP to manage flows and selenium loads is assessed at this site.

Data Summary

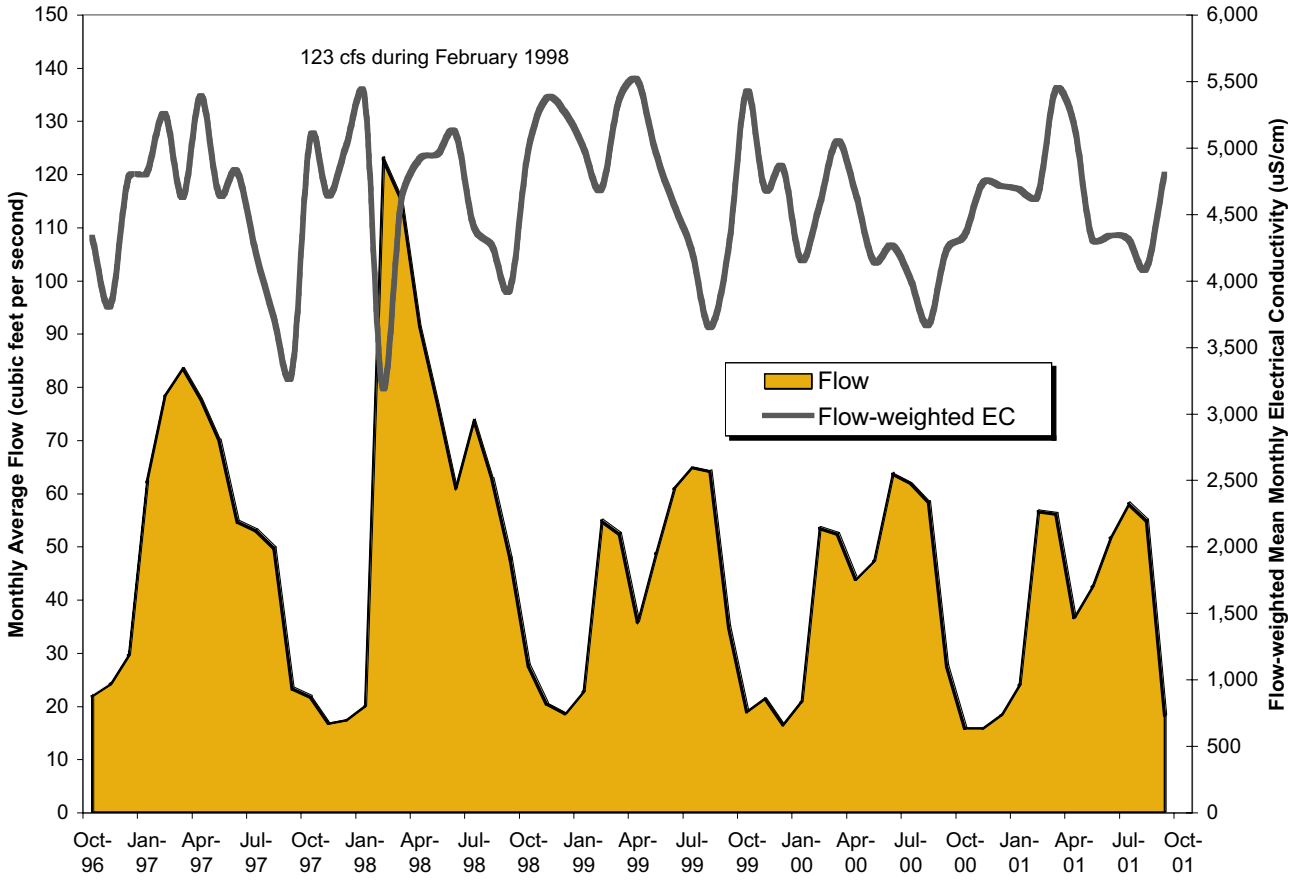
Table 3 and Figure 3 summarize the flow and salinity of water that passed Station B during the five years of the Project.

During Water Year 2001, the average flow that passed Station B was 39 cfs. The peak flow of 82 cfs occurred on March 8, 2001, one day after a similar peak at Station A. The total volume of drainage water that passed this site was 28,234 acre-feet.

EC ranged from 3,090 to 5,610 µS/cm, with a flow-weighted average of 4,166 µS/cm. About 120,000 tons of salt were discharged from the San Luis Drain into Mud Slough.

The total volume of water discharged during Water Year 2001 was about nine percent less than that discharged during the 2000 Water Year. The load of salt discharged was about 11 percent less than Water Year 2000.

Figure 2. Flow & Salinity of Water Entering the San Luis Drain (Station A)



Performance

EC and temperature data were collected every day except for three days during this water year. This was due to regular inspections and rinsing with vinegar to prevent algae accumulations on the sensor that have occurred in previous years.

Station C

Location Mud Slough, approximately 1/2 mile upstream of San Luis Drain terminus (CVRWQCB MER536)

Responsibility CVRWQCB

Parameters Electrical conductivity, temperature, pH, boron

Equipment None. Weekly grab samples are taken here

Description

Station C is located in Mud Slough upstream from the end of the San Luis Drain. Water at this point comes from wetlands in the Grassland Water District. Data collected at this site are considered a baseline for measuring the impact of the GBP on the slough. The CVRWQCB collected weekly water quality samples here, and the US Fish & Wildlife Service sampled fish and invertebrates four times at this site.

Data Summary

Table 4 and Figure 4 summarize the flow and salinity of water that passed Station C during the five years of the Project. Flow was not measured at this site, but was estimated as the difference between flows passing Stations D and B.

During Water Year 2001, about 64,600 acre-feet of water passed this site at an average rate of 90 cfs. Flows peaked in mid-March at 385 cfs and diminished in August to less than 10 cfs. The salinity of water at this site was measured by the CVRWQCB in its weekly grab samples. The flow-weighted average EC of water at this site was 1,696 µS/cm. The water was most saline on April 26, 2001 at 3,460 µS/cm, and was about 700µS/cm during September 2000. About 92,700 tons of salt in water passed this site during Water Year 2001.

Figure 3. Flow & Salinity of Water in the San Luis Drain (Station B)

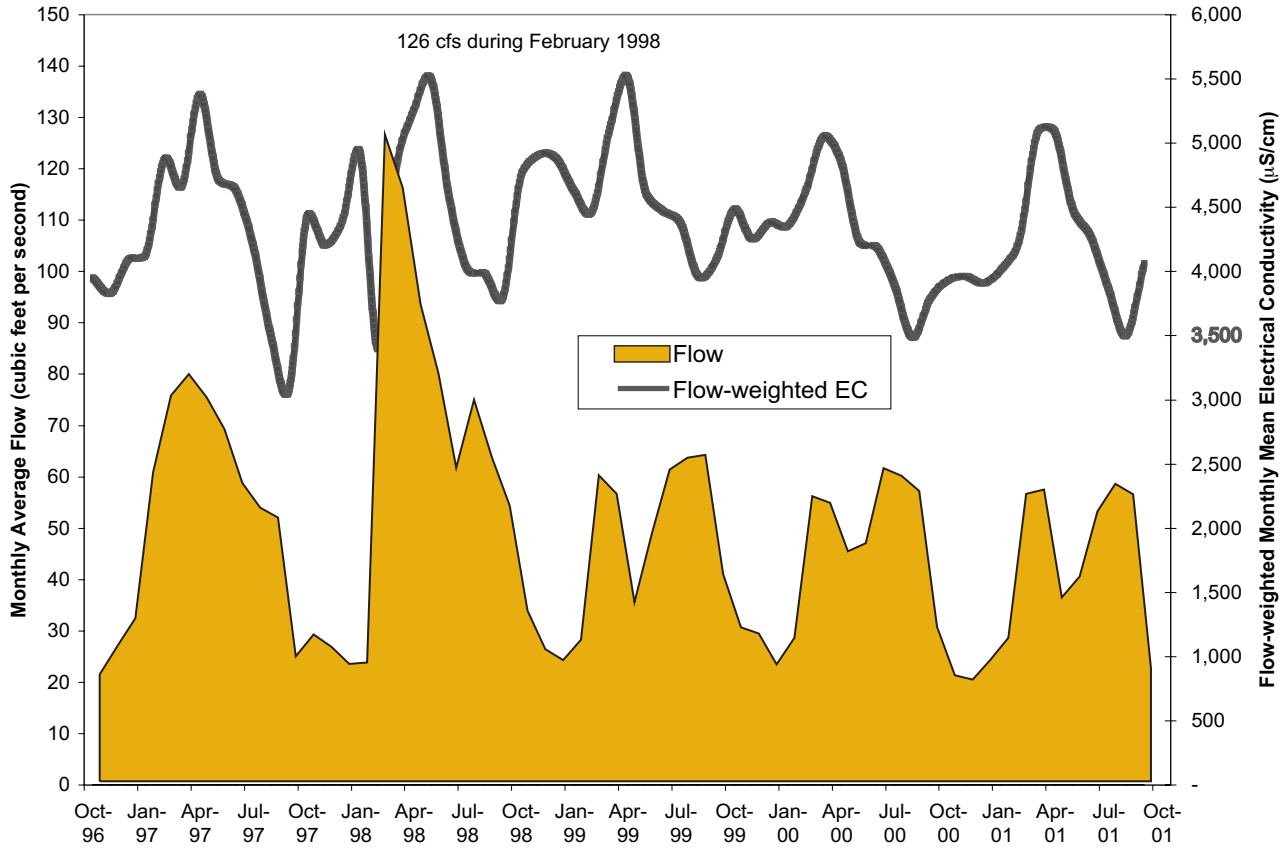


Table 3. Monthly Flow and Salinity of Water in the San Luis Drain (Station B) WY 1997 - 2001

	Flow				Salinity					
	Monthly Average cfs		Total acre-feet		FW EC µS/cm		TDS mg/L		Salt load tons	
Oct-1996	20.8	L	1,276	L	3,948	L	2,922	Lr	5,070	Lr
Nov-1996	26.4	L	1,569	L	3,830	L	2,834	Lr	6,048	Lr
Dec-1996	31.7	L	1,946	L	4,095	L	3,030	Lr	8,020	Lr
Jan-1997	60.2	L	3,703	L	4,142	L	3,065	Lr	15,433	Lr
Feb-1997	75.1	L	4,173	L	4,872	L	3,605	Lr	20,463	Lr
Mar-1997	79.3	L	4,876	L	4,669	L	3,455	Lr	22,913	Lr
Apr-1997	74.8	L	4,453	L	5,380	L	3,981	Lr	24,111	Lr
May-1997	68.6	L	4,215	L	4,730	L	3,500	Lr	20,063	Lr
Jun-1997	58.1	L	3,457	L	4,642	L	3,435	Lr	16,153	Lr
Jul-1997	53.3	L	3,277	L	4,206	L	3,112	Lr	13,873	Lr
Aug-1997	51.4	L	3,159	L	3,497	L	2,588	Lr	11,117	Lr
Sep-1997	24.3	L	1,445	L	3,077	L	2,277	Lr	4,474	Lr
Oct-1997	28.6	L	1,756	L	4,425	L	3,275	Lr	7,819	Lr
Nov-1997	26.2	L	1,558	L	4,206	L	3,112	Lr	6,594	Lr
Dec-1997	22.9	L	1,406	L	4,398	L	3,255	Lr	6,221	Lr
Jan-1998	23.1	L	1,421	L	4,919	L	3,640	Lr	7,036	Lr
Feb-1998	125.9	L	6,993	L	3,397	L	2,514	Lr	23,906	Lr
Mar-1998	115.6	L	7,106	L	4,788	L	3,543	Lr	34,244	Lr
Apr-1998	92.9	L	5,527	L	5,258	L	3,891	Lr	29,250	Lr
May-1998	79.5	L	4,890	L	5,494	L	4,066	Lr	27,036	Lr
Jun-1998	61.1	L	3,635	L	4,576	L	3,386	Lr	16,740	Lr
Jul-1998	74.3	L	4,572	L	4,020	L	2,975	Lr	18,494	Lr
Aug-1998	63.1	L	3,883	L	3,983	L	2,947	Lr	15,561	Lr
Sep-1998	53.7	L	3,193	L	3,798	L	2,811	Lr	12,203	Lr
Oct-1998	33.2	G	2,040	G	4,738	Gr	3,506	Gr	9,742	Gr
Nov-1998	25.7	G	1,530	G	4,909	Gr	3,633	Gr	7,546	Gr
Dec-1998	23.6	G	1,450	G	4,881	Gr	3,612	Gr	7,142	Gr
Jan-1999	27.6	G	1,700	G	4,628	Gr	3,425	Gr	7,909	Gr
Feb-1999	59.6	G	3,310	G	4,467	Gr	3,306	Gr	14,883	Gr
Mar-1999	56.0	G	3,450	G	5,117	Gr	3,787	Gr	17,743	Gr
Apr-1999	34.9	G	2,080	G	5,512	Gr	4,079	Gr	11,532	Gr
May-1999	48.2	G	2,960	G	4,637	Gr	3,431	Gr	13,830	Gr
Jun-1999	60.7	G	3,610	G	4,471	Gr	3,309	Gr	16,252	Gr
Jul-1999	63.0	G	3,870	G	4,380	Gr	3,241	Gr	17,068	Gr
Aug-1999	63.6	G	3,910	G	3,960	Gr	2,930	Gr	15,596	Gr
Sep-1999	40.3	G	2,400	G	4,094	Gr	3,030	Gr	9,890	Gr
Oct-1999	30.0	G	1,847	G	4,482	Gr	3,317	Gr	8,329	Gr
Nov-1999	28.8	G	1,714	G	4,253	Gr	3,147	Gr	7,334	Gr
Dec-1999	22.8	G	1,400	G	4,383	Gr	3,243	Gr	6,177	Gr
Jan-2000	27.9	G	1,716	G	4,355	Gr	3,223	Gr	7,520	Gr
Feb-2000	55.5	G	3,191	G	4,622	Gr	3,420	Gr	14,844	Gr
Mar-2000	54.2	G	3,330	G	5,047	Gr	3,735	Gr	16,916	Gr
Apr-2000	44.8	G	2,660	G	4,863	Gr	3,599	Gr	13,037	Gr
May-2000	46.4	G	2,850	G	4,238	Gr	3,136	Gr	12,157	Gr
Jun-2000	61.0	G	3,630	G	4,190	Gr	3,101	Gr	15,313	Gr
Jul-2000	59.5	G	3,660	G	3,899	Gr	2,885	Gr	14,344	Gr
Aug-2000	56.5	G	3,470	G	3,485	Gr	2,579	Gr	12,180	Gr
Sep-2000	30.1	G	1,790	G	3,792	Gr	2,806	Gr	6,843	Gr
Oct-2000	20.6	G	1,270	G	3,930	G	2,908	Gr	4,991	Gr
Nov-2000	19.8	G	1,180	G	3,960	G	2,930	Gr	4,690	Gr
Dec-2000	23.7	G	1,460	G	3,910	G	2,893	Gr	5,733	Gr
Jan-2001	27.9	G	1,720	G	4,020	G	2,975	Gr	6,946	Gr
Feb-2001	56.0	G	3,110	G	4,245	Gr	3,141	Gr	13,279	Gr
Mar-2001	56.8	G	3,490	G	5,080	G	3,759	Gr	17,747	Gr
Apr-2001	35.8	G	2,130	G	5,090	G	3,767	Gr	10,926	Gr
May-2001	39.9	G	2,454	G	4,488	Gr	3,321	Gr	11,082	Gr
Jun-2001	52.6	G	3,130	G	4,276	Gr	3,164	Gr	13,461	Gr
Jul-2001	57.9	G	3,560	G	3,870	G	2,864	Gr	13,833	Gr
Aug-2001	55.9	G	3,440	G	3,500	G	2,590	Gr	12,074	Gr
Sep-2001	22.0	G	1,310	G	4,060	G	3,004	Gr	5,246	Gr

	Monthly Average mean cfs	Total total acre-feet	FW EC mean µS/cm	TDS mean mg/L	Salt load total tons
WY 1997	52.0	37,550	4,257	3,150	167,739
WY 1998	63.9	45,939	4,439	3,284	205,104
WY 1999	44.7	32,310	4,650	3,441	149,133
WY 2000	43.1	31,258	4,301	3,183	134,994
WY 2001	39.1	28,254	4,202	3,110	120,008

Station D

Location	Mud Slough near Gustine, California (USGS 11262900) (CVRWQCB MER542)
Responsibility	US Geological Survey (flow, EC, temp), CVRWQCB (EC, water quality)
Parameters	Stage, electrical conductivity, temperature
Equipment	Nitrogen bubbler pressure transducer, electrical conductivity/temperature sensor, data logger, cellular telephone and modem.

Description

Station D is located in Mud Slough downstream from the terminus of the SLD.

Data summary

Table 5 and Figure 5 summarize the daily flow and salinity of water that passed Station D during the five years of the Project.

During Water Year 2001, approximately 92,900 acre-feet of water passed this site. The GBP contributed 30% of this flow. The average flow passing Station D was 129 cfs. The flow-weighted average EC of water passing this site was 2,769 µS/cm. Approximately 214,400 tons of salt flowed past this site, 44 percent coming from the GBP.

Performance

EC and temperature data were lost for 61 days during November, December, February, April, May, and September due to vandalism and equipment failure. The EC/temperature probe was replaced three times. The data logger failed in April and again in May 2001.

Station F

Location	Salt Slough at Highway 165 near Stevinson, California (USGS 11261100) (CVRWQCB MER531)
Responsibility	US Geological Survey
Parameters	Stage, electrical conductivity, temperature
Equipment	Nitrogen bubbler pressure transducer, electrical conductivity/temperature sensor, data logger, cellular telephone and modem.

Description

Station F is where flow and water quality are monitored in Salt Slough. The GBP has removed the GDA's agricultural drainage water from this stream. The water in this channel is derived from wetlands and farmlands outside the GDA area.

Figure 4. Flow & Salinity of Water in Mud Slough Upstream of Drainage Discharge (Station C)

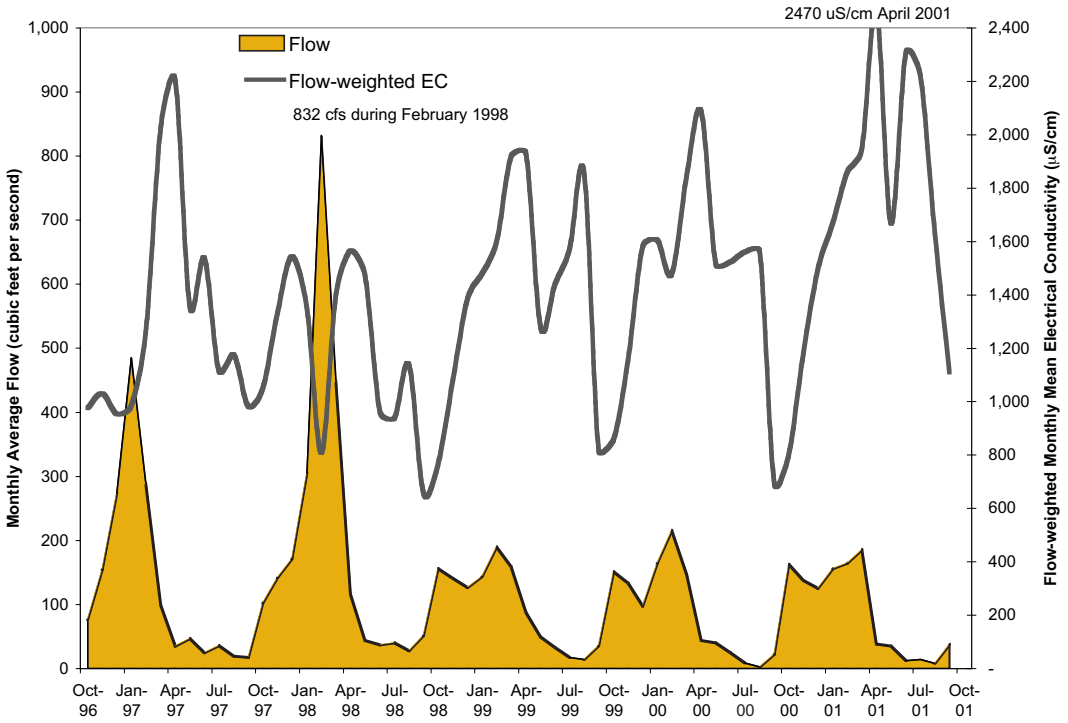


Table 4. Monthly Flow and Salinity of Water in Mud Slough Upstream of Drainage Discharge (Station C) WY 1997 - 2001

	Flow (*)				Salinity					
	Monthly Average cfs		Total acre-feet		FW EC µS/cm		TDS mg/L		Salt load tons	
Oct-1996	76.4	Gr	4,704	Gr	975	Rr	663	Rr	4,242	Rr
Nov-1996	154.6	Gr	9,181	Gr	1,030	Rr	700	Rr	8,745	Rr
Dec-1996	273.3	Gr	16,804	Gr	954	Rr	649	Rr	14,825	Rr
Jan-1997	484.8	Gr	29,807	Gr	984	Rr	669	Rr	27,124	Rr
Feb-1997	287.9	Gr	16,007	Gr	1,259	Rr	856	Rr	18,637	Rr
Mar-1997	98.7	Gr	6,044	Gr	2,026	Rr	1,378	Rr	11,324	Rr
Apr-1997	35.2	Gr	2,097	Gr	2,205	Rr	1,499	Rr	4,276	Rr
May-1997	46.4	Gr	2,875	Gr	1,357	Rr	923	Rr	3,608	Rr
Jun-1997	24.4	Gr	1,453	Gr	1,537	Rr	1,045	Rr	2,065	Rr
Jul-1997	35.7	Gr	2,193	Gr	1,116	Rr	759	Rr	2,263	Rr
Aug-1997	19.1	Gr	1,181	Gr	1,176	Rr	800	Rr	1,284	Rr
Sep-1997	17.3	Gr	1,035	Gr	981	Rr	667	Rr	939	Rr
Oct-1997	102.4	Gr	6,304	Gr	1,049	Rr	713	Rr	6,116	Rr
Nov-1997	141.8	Gr	8,422	Gr	1,330	Rr	904	Rr	10,359	Rr
Dec-1997	171.1	Gr	10,554	Gr	1,543	Rr	1,049	Rr	15,060	Rr
Jan-1998	304.9	Gr	18,749	Gr	1,352	Rr	919	Rr	23,442	Rr
Feb-1998	832.1	Gr	46,197	Gr	808	Rr	549	Rr	34,520	Rr
Mar-1998	447.4	Gr	27,484	Gr	1,400	Rr	952	Rr	35,584	Rr
Apr-1998	116.1	Gr	6,923	Gr	1,566	Rr	1,065	Rr	10,026	Rr
May-1998	43.5	Gr	2,660	Gr	1,474	Rr	1,002	Rr	3,626	Rr
Jun-1998	36.6	Gr	2,175	Gr	961	Rr	653	Rr	1,933	Rr
Jul-1998	39.7	Gr	2,408	Gr	937	Rr	637	Rr	2,087	Rr
Aug-1998	27.7	Gr	1,697	Gr	1,138	Rr	774	Rr	1,786	Rr
Sep-1998	51.3	Gr	3,067	Gr	657	Rr	447	Rr	1,863	Rr
Oct-1998	155.8	Gr	9,570	Gr	764	Rr	520	Rr	6,762	Rr
Nov-1998	140.3	Gr	8,370	Gr	1,081	Rr	735	Rr	8,368	Rr
Dec-1998	126.4	Gr	7,780	Gr	1,385	Rr	942	Rr	9,965	Rr
Jan-1999	143.4	Gr	8,820	Gr	1,479	Rr	1,006	Rr	12,064	Rr
Feb-1999	189.4	Gr	10,540	Gr	1,598	Rr	1,087	Rr	15,576	Rr
Mar-1999	159.0	Gr	9,780	Gr	1,919	Rr	1,305	Rr	17,356	Rr
Apr-1999	87.1	Gr	5,160	Gr	1,929	Rr	1,312	Rr	9,205	Rr
May-1999	49.3	Gr	3,030	Gr	1,280	Rr	870	Rr	3,587	Rr
Jun-1999	32.8	Gr	1,960	Gr	1,441	Rr	980	Rr	2,612	Rr
Jul-1999	17.2	Gr	1,060	Gr	1,572	Rr	1,069	Rr	1,541	Rr
Aug-1999	14.3	Gr	880	Gr	1,855	Rr	1,261	Rr	1,510	Rr
Sep-1999	35.4	Gr	2,100	Gr	817	Rr	556	Rr	1,587	Rr
Oct-1999	151.0	Gr	9,283	Gr	857	Rr	583	Rr	7,357	Rr
Nov-1999	133.2	Gr	7,916	Gr	1,156	Rr	786	Rr	8,463	Rr
Dec-1999	97.2	Gr	5,960	Gr	1,580	Rr	1,074	Rr	8,709	Rr
Jan-2000	164.1	Gr	10,064	Gr	1,606	Rr	1,092	Rr	14,947	Rr
Feb-2000	215.5	Gr	12,419	Gr	1,478	Rr	1,005	Rr	16,975	Rr
Mar-2000	146.8	Gr	9,030	Gr	1,845	Rr	1,255	Rr	15,407	Rr
Apr-2000	43.4	Gr	2,590	Gr	2,087	Rr	1,419	Rr	4,999	Rr
May-2000	40.1	Gr	2,470	Gr	1,516	Rr	1,031	Rr	3,463	Rr
Jun-2000	24.4	Gr	1,450	Gr	1,523	Rr	1,036	Rr	2,042	Rr
Jul-2000	8.8	Gr	540	Gr	1,560	Rr	1,061	Rr	779	Rr
Aug-2000	2.4	Gr	150	Gr	1,563	Rr	1,063	Rr	217	Rr
Sep-2000	22.0	Gr	1,310	Gr	694	Rr	472	Rr	841	Rr
Oct-2000	162.4	Gr	9,964	Gr	801	Rr	545	Rr	7,381	Rr
Nov-2000	137.4	Gr	8,176	Gr	1,179	Rr	802	Rr	8,915	Rr
Dec-2000	125.3	Gr	7,702	Gr	1,494	Rr	1,016	Rr	10,641	Rr
Jan-2001	156.0	Gr	9,590	Gr	1,669	Rr	1,135	Rr	14,802	Rr
Feb-2001	164.2	Gr	9,120	Gr	1,860	Rr	1,265	Rr	15,688	Rr
Mar-2001	185.1	Gr	11,382	Gr	1,945	Rr	1,323	Rr	20,473	Rr
Apr-2001	37.8	Gr	2,250	Gr	2,470	Rr	1,680	Rr	5,140	Rr
May-2001	34.7	Gr	2,136	Gr	1,668	Rr	1,134	Rr	3,295	Rr
Jun-2001	12.0	Gr	712	Gr	2,306	Rr	1,568	Rr	1,518	Rr
Jul-2001	14.3	Gr	877	Gr	2,222	Rr	1,511	Rr	1,802	Rr
Aug-2001	8.2	Gr	501	Gr	1,630	Rr	1,108	Rr	755	Rr
Sep-2001	37.1	Gr	2,207	Gr	1,109	Rr	754	Rr	2,264	Rr

	Monthly Average mean cfs	Total total acre-feet	FW EC mean µS/cm	TDS mean mg/L	Salt load total tons
WY 1997	129.5	93,381	1,300	884	99,334
WY 1998	192.9	136,640	1,185	806	146,403
WY 1999	95.9	69,050	1,427	970	90,132
WY 2000	87.4	63,182	1,455	990	84,197
WY 2001	89.5	64,617	1,696	1,153	92,674

(*) Flow passing Station C is calculated as difference between flows at Stations D and B.

Data Summary

Table 6 and Figure 6 summarize the daily flow and EC of water that passed Station F during the five years of the Project.

No water from the GDA was released into Salt Slough during Water Year 2001. The average flow of water was 185 cfs. The peak flow of 714 cfs occurred on March 8, 2001. Approximately 133,900 acre-feet flowed past this site during this water year.

The flow-weighted average EC of water was 1,350 µS/cm, ranging from 863 to 1,860 µS/cm. The total salt load was 168,700 tons.

The total volume of water in Salt Slough during Water Year 2001 was about 5 percent less than 2000 Water Year. However, the load of salt in the water was similar to the salt load in Water Year 2000 due to slight increase in average electrical conductivity.

Performance

EC and temperature data were lost for 45 days due to equipment failure and vandalism.

Comments

The California Department of Water Resources also measures flow at this site.

Station N

Location	San Joaquin River at Crows Landing, California (USGS 11274550) (CVRWQCB STC504)
Responsibility	US Geological Survey (flow, EC, temp), CVRWQCB (EC, water quality)
Parameters	Stage, electrical conductivity, temperature
Equipment	Nitrogen bubbler pressure transducer, electrical conductivity/temperature sensor, data logger, cellular telephone and modem.

Description

Station N is located at Crows Landing on the San Joaquin River, a few miles downstream of the tributary of the Merced River.

Figure 5. Monthly Flow and Salinity of Water in Mud Slough (Station D)

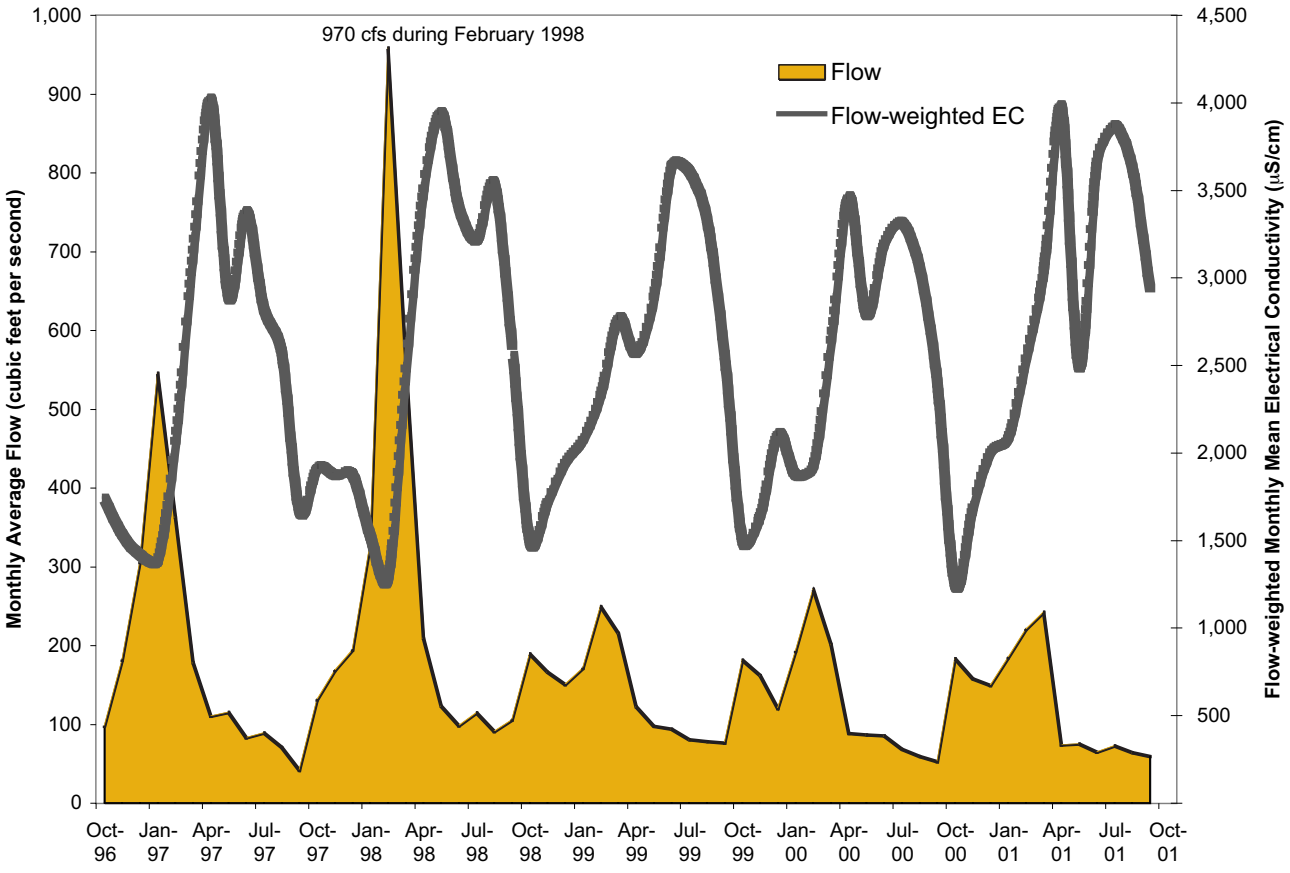


Table 5. Monthly Flow and Salinity of Water in Mud Slough (Station D) WY 1997 - 2001

	Flow				Salinity					
	Monthly Average cfs		Total acre-feet		FW EC µS/cm		TDS mg/L		Salt load tons	
Oct-1996	97.2	G	5,980	G	1,738	Gr	1,199	Gr	9,748	Gr
Nov-1996	181.0	G	10,750	G	1,536	Gr	1,060	Gr	15,496	Gr
Dec-1996	305.0	G	18,750	G	1,418	Gr	978	Gr	24,950	Gr
Jan-1997	545.0	G	33,510	G	1,390	Gr	959	Gr	43,714	Gr
Feb-1997	363.0	G	20,180	G	2,077	Gr	1,433	Gr	39,324	Gr
Mar-1997	178.0	G	10,920	G	3,167	Gr	2,185	Gr	32,460	Gr
Apr-1997	110.0	G	6,550	G	4,018	Gr	2,772	Gr	24,701	Gr
May-1997	115.0	G	7,090	G	2,891	Gr	1,995	Gr	19,227	Gr
Jun-1997	82.5	G	4,910	G	3,378	Gr	2,331	Gr	15,555	Gr
Jul-1997	89.0	G	5,470	G	2,819	Gr	1,945	Gr	14,475	Gr
Aug-1997	70.5	G	4,340	G	2,576	Gr	1,777	Gr	10,483	Gr
Sep-1997	41.6	G	2,480	G	1,672	Gr	1,154	Gr	3,887	Gr
Oct-1997	131.0	G	8,060	G	1,916	Gr	1,322	Gr	14,493	Gr
Nov-1997	168.0	G	9,980	G	1,873	Gr	1,292	Gr	17,530	Gr
Dec-1997	194.0	G	11,960	G	1,873	Gr	1,292	Gr	21,011	Gr
Jan-1998	328.0	G	20,170	G	1,526	Gr	1,053	Gr	28,880	Gr
Feb-1998	958.0	G	53,190	G	1,289	Gr	889	Gr	64,346	Gr
Mar-1998	563.0	G	34,590	G	2,489	Gr	1,717	Gr	80,684	Gr
Apr-1998	209.0	G	12,450	G	3,519	Gr	2,428	Gr	41,113	Gr
May-1998	123.0	G	7,550	G	3,945	Gr	2,722	Gr	27,964	Gr
Jun-1998	97.7	G	5,810	G	3,403	Gr	2,348	Gr	18,562	Gr
Jul-1998	114.0	G	6,980	G	3,218	Gr	2,220	Gr	21,089	Gr
Aug-1998	90.8	G	5,580	G	3,534	Gr	2,438	Gr	18,510	Gr
Sep-1998	105.0	G	6,260	G	2,618	Gr	1,806	Gr	15,382	Gr
Oct-1998	189.0	G	11,610	G	1,495	Gr	1,032	Gr	16,286	Gr
Nov-1998	166.0	G	9,900	G	1,727	Gr	1,192	Gr	16,051	Gr
Dec-1998	150.0	G	9,230	G	1,950	Gr	1,346	Gr	16,883	Gr
Jan-1999	171.0	G	10,520	G	2,083	Gr	1,437	Gr	20,564	Gr
Feb-1999	249.0	G	13,850	G	2,338	Gr	1,613	Gr	30,373	Gr
Mar-1999	215.0	G	13,230	G	2,771	Gr	1,912	Gr	34,411	Gr
Apr-1999	122.0	G	7,240	G	2,572	Gr	1,775	Gr	17,480	Gr
May-1999	97.5	G	5,990	G	2,900	Gr	2,001	Gr	16,314	Gr
Jun-1999	93.5	G	5,570	G	3,644	Gr	2,514	Gr	19,032	Gr
Jul-1999	80.2	G	4,930	G	3,608	Gr	2,490	Gr	16,689	Gr
Aug-1999	77.9	G	4,790	G	3,334	Gr	2,300	Gr	14,980	Gr
Sep-1999	75.7	G	4,500	G	2,558	Gr	1,765	Gr	10,808	Gr
Oct-1999	181.0	G	11,130	G	1,498	Gr	1,034	Gr	15,642	Gr
Nov-1999	162.0	G	9,630	G	1,647	Gr	1,136	Gr	14,885	Gr
Dec-1999	120.0	G	7,360	G	2,109	Gr	1,455	Gr	14,570	Gr
Jan-2000	192.0	G	11,780	G	1,874	Gr	1,293	Gr	20,724	Gr
Feb-2000	271.0	G	15,610	G	1,931	Gr	1,332	Gr	28,291	Gr
Mar-2000	201.0	G	12,360	G	2,653	Gr	1,831	Gr	30,773	Gr
Apr-2000	88.2	G	5,250	G	3,463	Gr	2,389	Gr	17,056	Gr
May-2000	86.5	G	5,320	G	2,791	Gr	1,926	Gr	13,935	Gr
Jun-2000	85.4	G	5,080	G	3,204	Gr	2,211	Gr	15,273	Gr
Jul-2000	68.3	G	4,200	G	3,315	Gr	2,287	Gr	13,055	Gr
Aug-2000	58.9	G	3,620	G	3,059	Gr	2,111	Gr	10,402	Gr
Sep-2000	52.1	G	3,100	G	2,403	Gr	1,658	Gr	6,996	Gr
Oct-2000	183.0	G	11,234	Gr	1,250	G	863	Gr	12,741	Gr
Nov-2000	157.2	G	9,356	Gr	1,696	Gr	1,170	Gr	14,891	Gr
Dec-2000	149.0	G	9,162	Gr	2,011	Gr	1,388	Gr	17,286	Gr
Jan-2001	183.9	G	11,310	Gr	2,090	G	1,442	Gr	21,903	Gr
Feb-2001	220.2	G	12,230	Gr	2,546	Gr	1,757	Gr	29,224	Gr
Mar-2001	241.9	G	14,872	Gr	3,050	G	2,105	Gr	39,046	Gr
Apr-2001	73.6	G	4,380	Gr	3,975	Gr	2,743	Gr	16,336	Gr
May-2001	74.6	G	4,590	Gr	2,492	Gr	1,719	Gr	10,733	Gr
Jun-2001	64.6	G	3,842	Gr	3,670	G	2,532	Gr	13,088	Gr
Jul-2001	72.2	G	4,437	Gr	3,870	G	2,670	Gr	16,043	Gr
Aug-2001	64.1	G	3,941	Gr	3,630	G	2,505	Gr	13,406	Gr
Sep-2001	59.1	G	3,517	Gr	2,946	Gr	2,033	Gr	9,723	Gr

	Monthly Average mean cfs	Total total acre-feet	FW EC mean µS/cm	TDS mean mg/L	Salt load total tons
WY 1997	181.5	130,930	2,390	1,649	254,022
WY 1998	256.8	182,580	2,600	1,794	369,564
WY 1999	140.6	101,360	2,582	1,781	229,871
WY 2000	130.5	94,440	2,496	1,722	201,601
WY 2001	128.6	92,871	2,769	1,910	214,420

Data Summary

Table 7 and Figure 7 summarize the mean daily flow and EC of water that passed Station N during the five years of the Project.

During Water Year 2001, the average flow that passed this site was about 900 cfs. The maximum flow of 2,990 cfs occurred on March 8, 2001. The total amount of water that passed this site was 653,400 acre-feet. The discharge from the GBP was about 4 percent of this flow. The flow-weighted average EC of water that passed Station N was 1,185µS/cm. The load of salt in the water was about 623,600 tons. The discharge from the GBP was about 19 percent of the salt load measured at this site.

Performance

EC and temperature data were lost for 23 days during May 2001 because of vandalism.

Comments

The location is not ideal because it is on a bend in the river. The stage-discharge relationship varies during high flows due to bank erosion and sediment deposit. The logistics for making current meter readings at this site are very difficult at high stages. Current meter readings are taken from a boat.

Other Monitoring Stations

Stations G and H are located on the San Joaquin River. The CVRWQCB collected weekly grab samples at Station G, and the EC of each sample was measured in a laboratory. The CVRWQCB did not collect water quality samples at Station H during Water Year 2001. Flow is not measured at these locations.

The CVRWQCB also collected weekly water quality samples at Stations J, K, L2, and M2 (Camp 13, Agatha, San Luis, and Santa Fe Canals, respectively). The purpose of these sites is to ensure that no agricultural drainage water from the GDA enters wetland supply channels in Grasslands Water District. The EC of each sample was measured in the laboratory. Flow is measured daily at these locations by Grasslands Water District.

Table 8 summarizes EC measurements of water that passed these stations during the five years of the Project. The data shows an increase in salinity as water passes across the southern portion of Grassland Water District. During Water Year 2001, the average salinity of

Figure 6. Flow and Salinity of Water in Salt Slough (Station F)

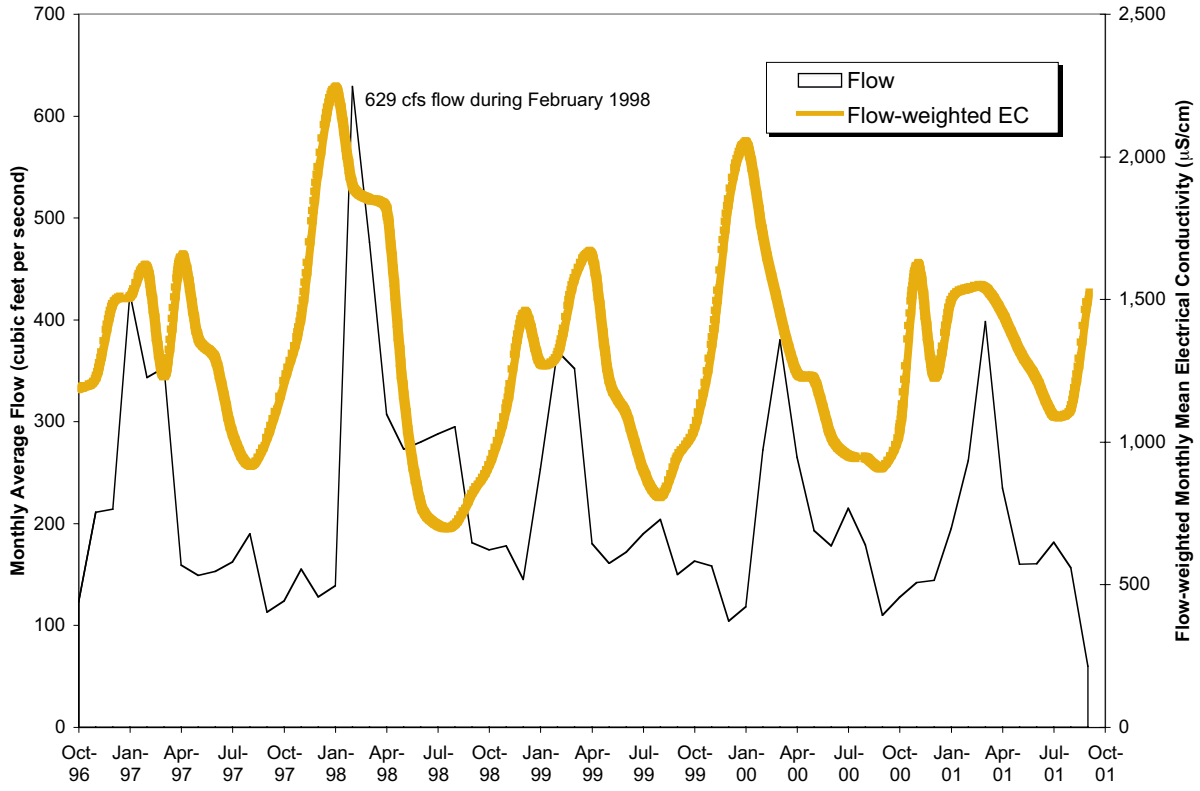


Table 6. Monthly Flow and Salinity of Water in Salt Slough (Station F) WY 1997 - 2001

	Flow		Salinity		
	Monthly Average cfs	Total acre-feet	FW EC µS/cm	TDS mg/L	Salt load 0.68 tons
Oct-1996	123	7,590	1,188	808	8,342
Nov-1996	211	12,550	1,228	835	14,256
Dec-1996	214	13,140	1,490	1,013	17,831
Jan-1997	426	26,160	1,511	1,027	36,560
Feb-1997	343	19,050	1,608	1,093	28,323
Mar-1997	353	21,720	1,233	838	24,764
Apr-1997	159	9,450	1,653	1,124	14,445
May-1997	149	9,140	1,363	927	11,523
Jun-1997	153	9,130	1,292	879	10,903
Jul-1997	162	9,940	1,029	700	9,459
Aug-1997	190	11,690	919	625	9,929
Sep-1997	113	6,720	1,020	694	6,335
Oct-1997	124	7,680	1,220	830	8,668
Nov-1997	155	9,320	1,449	985	12,486
Dec-1997	128	7,940	1,970	1,340	14,466
Jan-1998	139	8,700	2,242	1,525	18,028
Feb-1998	629	35,030	1,901	1,293	61,588
Mar-1998	476	29,420	1,850	1,258	50,326
Apr-1998	307	18,420	1,817	1,236	30,946
May-1998	273	16,840	1,165	792	18,148
Jun-1998	280	16,800	781	531	12,128
Jul-1998	288	17,930	708	481	11,740
Aug-1998	295	17,250	714	486	11,391
Sep-1998	181	10,770	824	560	8,208
Oct-1998	174	10,720	925	629	9,165
Nov-1998	178	10,570	1,123	764	10,974
Dec-1998	145	8,930	1,454	989	11,999
Jan-1999	253	15,490	1,276	868	18,274
Feb-1999	369	20,490	1,311	891	24,841
Mar-1999	352	21,620	1,580	1,074	31,584
Apr-1999	180	10,730	1,652	1,123	16,396
May-1999	161	9,890	1,219	829	11,143
Jun-1999	172	10,270	1,098	747	10,430
Jul-1999	190	11,680	901	613	9,735
Aug-1999	204	12,520	811	551	9,387
Sep-1999	150	8,860	954	649	7,817
Oct-1999	163	10,010	1,054	717	9,752
Nov-1999	158	9,410	1,346	915	11,712
Dec-1999	104	6,410	1,856	1,262	11,010
Jan-2000	118	7,280	2,049	1,393	13,800
Feb-2000	272	15,670	1,724	1,172	24,979
Mar-2000	380	23,410	1,454	989	31,474
Apr-2000	265	15,770	1,241	844	18,099
May-2000	193	11,840	1,219	829	13,350
Jun-2000	178	10,600	1,019	693	9,991
Jul-2000	215	13,190	953	648	11,626
Aug-2000	179	10,990	944	642	9,595
Sep-2000	110	6,470	913	621	5,463
Oct-2000	127	7,831	1,044	710	7,559
Nov-2000	142	8,456	1,622	1,103	12,685
Dec-2000	144	8,858	1,231	837	10,085
Jan-2001	195	11,964	1,503	1,022	16,687
Feb-2001	262	14,563	1,540	1,047	20,497
Mar-2001	398	24,484	1,540	1,047	34,001
Apr-2001	235	13,962	1,450	986	18,739
May-2001	160	9,858	1,320	898	11,864
Jun-2001	161	9,553	1,220	830	10,682
Jul-2001	182	11,167	1,092	743	11,276
Aug-2001	157	9,632	1,120	762	9,708
Sep-2001	60	3,564	1,520	1,034	4,952

	Monthly Average mean cfs	Total total acre-feet	FW EC mean µS/cm	TDS mean mg/L	Salt load total tons
WY 1997	216	156,280	1,295	880	192,670
WY 1998	273	196,100	1,387	943	258,123
WY 1999	211	151,770	1,192	811	171,743
WY 2000	195	141,050	1,314	894	170,851
WY 2001	185	133,892	1,350	918	168,735

water in wetlands water supply channels, measured at Station G (Fremont Ford), was 1,514 µS/cm.

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Abbreviations from Tables and Figures:

EC	Electrical Conductivity or Specific conductance
FW	Flow-weighted average concentration
G	US Geological Survey published data
Gr	Monthly average or total calculated from USGS 15 minute data by USBR
L	Lawrence Berkeley Laboratory data
Lr	Monthly average or total calculated from LBL 15 minute data by USBR
R	California Regional Water Quality Control Board (Central Valley Region) data
Rr	Monthly average or total calculated from CVRWQCB data by USBR
S	San Luis & Delta-Mendota Water Authority
Sr	Monthly average or total calculated from SLDMWA data by USBR
TDS	Total Dissolved Solids

Figure 7. Flow and Salinity in the San Joaquin River at Crows Landing (Station N)

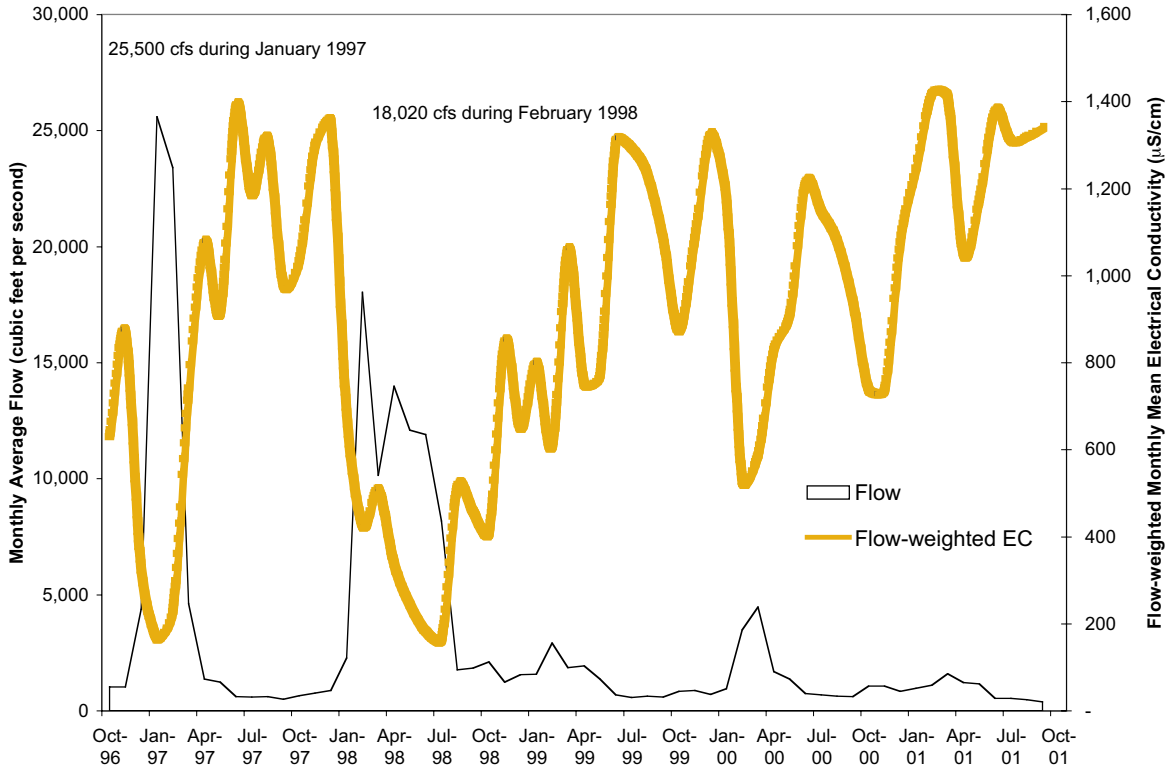

Table 7. Monthly Flow and Salinity of Water in the San Joaquin River at Crows Landing (Station N) WY 1997 - 2001

	Flow		Salinity		
	Monthly Average cfs	Total acre-feet	FW EC µS/cm	TDS mg/L	Salt load 0.62 tons
Oct-1996	1,013	62,290	633	392	33,262
Nov-1996	1,027	61,120	869	539	44,792
Dec-1996	4,364	268,300	326	202	73,753
Jan-1997	25,600	1,574,000	166	103	220,954
Feb-1997	23,390	1,299,000	231	143	253,517
Mar-1997	4,614	283,700	745	462	178,110
Apr-1997	1,353	80,480	1,078	668	73,128
May-1997	1,238	76,100	916	568	58,784
Jun-1997	605	35,980	1,390	862	42,186
Jul-1997	583	35,850	1,187	736	35,876
Aug-1997	612	37,630	1,315	815	41,729
Sep-1997	501	29,820	979	607	24,611
Oct-1997	648	39,860	1,037	643	34,861
Nov-1997	751	44,690	1,301	807	49,011
Dec-1997	866	53,260	1,352	838	60,705
Jan-1998	2,270	139,600	685	425	80,603
Feb-1998	18,020	1,001,000	427	265	360,319
Mar-1998	10,130	623,100	508	315	266,927
Apr-1998	13,980	832,100	339	210	238,007
May-1998	12,090	743,600	244	151	152,762
Jun-1998	11,890	707,300	183	113	109,320
Jul-1998	8,176	502,700	164	102	69,341
Aug-1998	1,757	108,100	518	321	47,242
Sep-1998	1,842	109,600	458	284	42,371
Oct-1998	2,092	128,600	410	254	44,509
Nov-1998	1,228	73,090	849	526	52,300
Dec-1998	1,553	95,490	650	403	52,295
Jan-1999	1,562	96,020	800	496	64,734
Feb-1999	2,909	161,500	609	378	82,991
Mar-1999	1,847	113,600	1,062	658	101,750
Apr-1999	1,937	115,200	751	466	72,955
May-1999	1,367	84,070	773	479	54,820
Jun-1999	684	40,690	1,310	812	44,925
Jul-1999	567	34,840	1,293	802	37,983
Aug-1999	615	37,810	1,233	764	39,320
Sep-1999	579	34,440	1,085	673	31,517
Oct-1999	836	51,890	874	542	38,233
Nov-1999	876	52,230	1,091	676	48,036
Dec-1999	695	42,230	1,327	823	47,265
Jan-2000	942	59,110	1,176	729	58,618
Feb-2000	3,480	201,700	530	329	90,098
Mar-2000	4,470	274,900	590	366	136,828
Apr-2000	1,690	100,200	833	516	70,370
May-2000	1,370	84,830	912	565	65,234
Jun-2000	739	43,800	1,214	753	44,821
Jul-2000	675	41,610	1,148	712	40,284
Aug-2000	630	38,800	1,080	670	35,341
Sep-2000	597	36,180	942	584	28,751
Oct-2000	1,050	64,622	738	458	34,895
Nov-2000	1,050	62,365	738	458	38,171
Dec-2000	831	51,105	1,080	670	46,134
Jan-2001	965	59,338	1,250	775	61,973
Feb-2001	1,090	60,745	1,420	880	71,151
Mar-2001	1,590	97,685	1,410	874	108,023
Apr-2001	1,210	71,848	1,051	652	63,652
May-2001	1,160	71,229	1,178	730	70,762
Jun-2001	524	31,187	1,380	856	36,057
Jul-2001	521	32,051	1,310	812	35,425
Aug-2001	472	28,999	1,320	818	32,284
Sep-2001	374	22,251	1,340	831	25,028

	Monthly Average mean cfs	Total total acre-feet	FW EC mean µS/cm	TDS mean mg/L	Salt load total tons
WY 1997	5,408	3,844,270	820	508	1,080,703
WY 1998	6,868	4,904,910	601	373	1,511,470
WY 1999	1,412	1,015,350	902	559	680,098
WY 2000	1,417	1,027,480	976	605	703,876
WY 2001	903	653,425	1,185	734	623,555

Table 8. Electrical Conductivity of Water Passing Other Monitoring Stations (WY 1997 - 2001)

GBP Station	B	G	H	J	K	L	L2	M	M2
Site ID	11262895	MER538	STC512	MER505	MER506	MER532	MER563	MER519	MER545
Location	GBP Discharge San Luis Drain terminus	San Joaquin River at Fremont Ford	San Joaquin River at Hills Ferry	Camp 13	Agatha Canal	San Luis Canal	San Luis Canal, d/s of Splits	Santa Fe Canal	Santa Fe Canal, d/s of Splits
Sample Method	(d)	(wg)	(wg)	(wg)	(wg)	(wg)	(wg)	(wg)	(wg)
Units	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm	µS/cm
Oct-1996	3,948	972	1,268	371	394				
Nov-1996	3,830	1,185	1,345	449	445	934		595	
Dec-1996	4,095	581	773	651	623	953		738	
Jan-1997	4,142	104	274	201	268				
Feb-1997	4,872	101	245	886	2217	1383		1,098	
Mar-1997	4,669	825	1,219	2340	185	1553		1,285	
Apr-1997	5,380	1,838	2,508	1520	540	1400		1,475	
May-1997	4,730	1,766	2,260	779	511	839		839	
Jun-1997	4,642	1,233	1,800	951	466	845		1,052	
Jul-1997	4,206	1,167	1,712	672	415	751		864	
Aug-1997	3,497	1,000	1,495	757	384	749		815	
Sep-1997	3,077	1,383	1,653	445	411	568		576	
Oct-1997	4,425	1,220	1,506	531	501	648		810	
Nov-1997	4,206	1,583	1,715	760	661	760		1,165	
Dec-1997	4,398	1,793	1,858	2638	818	1858		1,892	
Jan-1998	4,919	1,563	1,630	2728	1450	1363		2,738	
Feb-1998	3,397	229	821	2115	2948	1998		2,080	
Mar-1998	4,788	340	843	3055	1285	2078		2,200	
Apr-1998	5,258	145	602	2435	2631	1643		1,668	
May-1998	5,494	95	438	686	415	1292		843	
Jun-1998	4,576	75	269	1167	113	826		454	
Jul-1998	4,020	156	396	190	114	802		483	
Aug-1998	3,983	633	1,138	499	380	858	594	637	1,222
Sep-1998	3,798	608	1,031	280	316	441	406	442	573
Oct-1998	4,738	673	887	267	275	670	415		783
Nov-1998	4,909	1,015	1,234	338	367		435		952
Dec-1998	4,881	606	933	257	256		277		1,338
Jan-1999	4,628	1,268	1,575	701	1221		595		1,810
Feb-1999	4,467	915	1,223	637	883		867		1,908
Mar-1999	5,117	1,486	1,856	794	1471		711		2,042
Apr-1999	5,512	1,546	1,778	779	664		800		1,823
May-1999	4,637	1,518	1,838	442	409		552		955
Jun-1999	4,471	1,458	2,163	526	439		1574		1,084
Jul-1999	4,380	1,136	1,953	521	385		1281		1,125
Aug-1999	3,960	1,022	1,680	551	320		844		1,215
Sep-1999	4,094	1,017	1,488	447	472		507		590
Oct-1999	4,482	1,225		536	509		552		829
Nov-1999	4,253	1,493		614	598		845		1,059
Dec-1999	4,383	2,022		1011	859		817		1,832
Jan-2000	4,355	1,971		743	685		868		1,730
Feb-2000	4,622	1,161		992	1111		1721		2,358
Mar-2000	5,047	829		605	466		694		2,258
Apr-2000	4,863	1,416		661	556		749		1,548
May-2000	4,238	1,430		651	535		822		1,084
Jun-2000	4,190	1,218		596	480		1179		984
Jul-2000	3,899	949		500	411		1265		1,084
Aug-2000	3,485	998		675	397		1148		1,043
Sep-2000	3,792	1,143		419	393		442		493
Oct-2000	3,930	1,210		500	457		1030		648
Nov-2000	3,960	1,384		542	547		2104		966
Dec-2000	3,910	1,708		704	662		1995		1,118
Jan-2001	4,020	1,703		739	753		1519		1,492
Feb-2001	4,245	1,528		684	903		1695		1,675
Mar-2001	5,080	1,324		763	1254		1142		1,785
Apr-2001	5,090	1,668		723	1037		1110		1,723
May-2001	4,488	1,670		647	574		771		1,020
Jun-2001	4,276	1,383		544	577		709		1,370
Jul-2001	3,870	1,285		494	493		726		1,380
Aug-2001	3,500	1,244		619	620		729		1,356
Sep-2001	4,060	2,055		717	696		748		835

	average µS/cm	average µS/cm	average µS/cm	average µS/cm	average µS/cm	average µS/cm	average µS/cm	average µS/cm	average µS/cm
Water Year 1997	4,257	1,013	1,379	835	572	998		934	
Water Year 1998	4,439	703	1,021	1424	969	1214	500	1,284	
Water Year 1999	4,650	1,138	1,551	522	597		738		1,302
Water Year 2000	4,301	1,321		667	583		925		1,359
Water Year 2001	4,202	1,514		640	714		1190		1,281

(d) Flow-weighted averages calculated from USGS 15 minute EC data
(wg) Monthly averages calculated from CVRWQCB lab data of weekly grab samples
Site H monitoring discontinued by Regional Board during WY 2000 and 2001.
Sites L and M moved upstream by the Regional Board after WY 1999 to Sites L2 and M2.